

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) An image recognizing method of recognizing an object in an input image, said method comprising the steps of:

- (a) dividing an input image into a plurality of local-segments;
- (b) registering providing a learning image database storing a plurality of learning-local-segments provided by dividing a learning image into the plurality of learning-local-segmentsa learning image database, the learning image including an image model of the object, the learning image database further storing coordinates of each of the learning-local segments;
- (c) dividing the input image into a plurality of local-segments;
- (d) extracting, a learning-local segment from the learning image stored in the learning image database, a learning-local-segment which is most similar to the selected local-segment;
- (e) so as to relate the selected local-segment to relating the extracted learning-local segment to the selected local-segment;
- (f) estimating a position of an the object to-be-identified in the input image from coordinates of the selected-related local-segment and coordinates of the related learning-local-segment;
- (g) (f) providing the estimated position with a score if the estimated position is not previously estimated, and updating a adding a predetermined value

to the score of the estimated position in the input image if the estimated position is previously estimated;

(h) repeating steps (c), (d), (e), and (f) and (g) for each local-segment of the plurality of local-segments; and

(i) judging that the object to-be-identified is present at the estimated position when the updated-score to which the predetermined value is added is greater than a predetermined number for the estimated position.

2. (Currently Amended) An image recognizing method of recognizing an object in an input image, said method comprising the steps of:

(a) dividing an the input image into a plurality of local-segments;

(b) providing a set of learning-local-segments into which dividing a learning image including an image model of the object is divided, into a the set of learning-local-segments having a same sizes as the local-segments, and providing making-subsets, each formed of the learning-local-segments which are similar to each other;

(c) providing a same-type window database storing, for each of the subsets of learning-local-segments, registering image data of a representative learning-local-segment and coordinates of all of the learning-local-segments of each of the subsets in the learning image the corresponding subset into a same type window database;

(d) selecting a local-segment from the plurality of local-segments;

(e) extracting a representative learning-local-segment from the same-type window database which is most similar to the selected local-segments;

(f) as to relate relating the selected local-segment to a subset of the subsets which includes the representative learning-local-segment;

{g}(f) estimating a position of ~~an~~ the object ~~to be identified~~ in the input image from coordinates of the selected local-segment and coordinates of the related representative learning-local-segment;

{h}(g) providing the estimated position with a score if the estimated position is not previously estimated, updating adding a predetermined value to the a-score for of the estimated position in the input image if the estimated position is previously estimated;

{i}(h) repeating steps (d), (e), (f), and (g) and (h) for each local-segment of the plurality of local-segments; and

{j}(i) judging that the object ~~to be identified~~ is present at the estimated position when the updated score to which the predetermined value is added is greater than a predetermined number for the estimated position.

3. (Currently Amended) The image recognizing method according to claim 1, wherein:

~~said step (b) comprises the step of registering the learning image database stores the learning-local-segments the learning image into the learning image database by a shape-characteristic of the object to be identified;~~

~~said step (d) comprises the step of extracting the learning-local-segment which is similar to the selected local-segment from the learning image database by the shape-characteristic; and~~

~~said step {g}-{f} comprises the step of updating the score of the estimated position by the shape-characteristic.~~

4. (Currently Amended) The image recognizing method according to claim 2, wherein ~~said step (c) comprises the step of, the same-type window database stores, for each subset of learning-local-segments, registering image data of the representative learning-local-segment and coordinates of all of the learning-~~

local-segments of the corresponding subset and a shape-characteristic of the object to be identified ~~into the same type window database.~~

5. (Currently Amended) The image recognizing method according to claim 1, wherein:

said step (d) includes the steps of;

(d-1) calculating a sum of one of (i) each square of a difference between a pixel value of the selected local-segment and a pixel value of one of the learning-local-segments and (ii) each absolute value of the difference between the pixel value of the selected local-segment and the pixel value of the one of the learning-local-segments for each learning-local-segment; and

(d-2) extracting a pair formed of the selected local-segment and a learning-local-segment for which the sum is minimized; and

(d-3) step (e) includes the step of relating the selected local-segment to the learning-local-segment in the pair extracted in said step (d-2).

6. (Currently Amended) The image recognizing method according to claim 2, wherein:

said step (e) includes the steps of;

(e-1) calculating a sum of one of (i) each square of a difference between a pixel value of the selected local-segment and a pixel value of one of the representative learning-local-segments and (ii) each absolute value of the difference between the pixel value of the selected local-segment and the pixel value of the one of the representative learning-local-segments for each learning-local-segment; and

(e-2) extracting a pair formed of the selected local-segment and a representative learning-local-segment for which the sum is minimized; and

~~(e-3) step (f) includes the step of relating the selected local-segment to the representative learning-local-segment in the pair extracted in said step (e-2).~~

7. (Currently Amended) An image recognizing apparatus of recognizing an object in an input image, said apparatus comprising:

~~image dividing means for dividing an input image into a plurality of local-segments;~~

~~a learning image database learning means for registering storing a plurality of learning-local-segments provided by dividing a learning image into the learning-local-segments, the learning plurality including an image model of the object, the learning image database further storing coordinates of each of the learning-local segments into a learning image database;~~

~~image dividing means dividing the input image into a plurality of local-segments;~~

~~similar window extracting means for selecting a local-segment from the plurality of local-segments, for extracting a learning-local-segment from the learning image database which is most similar to the selected local-segment, and for relating the selected local-segment to the extracted learning-local-segment to the selected local segment;~~

~~object position estimating means for estimating a position of an the object to be identified in the input image from coordinates of the selected related local-segment and coordinates of the related learning-local-segment;~~

~~counting means for providing the estimated position with a score if the estimated position is not previously estimated, for counting adding a predetermined value to the a-score of the estimated position in the input image if the estimated position is previously estimated, and for counting the score; and~~

object determining means for judging that the object ~~to be identified~~ is present at the estimated position when the counted score is greater than a predetermined number for the estimated position.

8. (Currently Amended) An image recognizing apparatus for recognizing an object in an input image, said apparatus comprising:

image dividing means for dividing ~~an~~ the input image into a plurality of local-segments;

learning means for dividing a learning image into a set of learning-local-segments having ~~a~~ same sizes as the local-segments and for making subsets, each subset formed of learning-local-segments, from the set of learning-local-segments, which are similar to each other and for each subset of learning-local-segments, the learning image including an image of the object;

a same-type window database registering storing image data of a representative learning-local-segment and coordinates of all of subsets of the learning-local segments of the corresponding subset into a same type window database;

similar window extracting means for selecting a local-segment from the plurality of local-segments, for extracting from the same-type window database a representative learning-local-segment of one subset of the subsets which is most similar to the selected local-segment of the input image, and for relating the extracted representative learning-local-segment to the selected local-segment;

object position estimating means for estimating a position of ~~an~~ the object ~~to be identified~~ in the input image from coordinates of the selected local-segment and coordinates of the related representative learning-local-segment;

counting means for providing the estimated position with a score if the estimated position is not previously estimated, counting for adding a predetermined value to the a-score of the estimated position if the estimated position is previously estimated in the input image, and for counting the score; and

object determining means for judging that the object ~~to be identified~~ is present at the estimated position when the counted score is greater than a predetermined number for the estimated position.

9. (Currently Amended) An image recognizing apparatus comprising:
- image dividing means for dividing an input image into a plurality of local-segments;
- ~~learning means a learning image database for registering storing a plurality of learning-local-segments learning images by a shape-characteristic of an object to be identified into a learning image database, the learning-local-segments being provided by dividing a learning image into the learning-local-segments, the learning image including an image model of the object, the learning image database further storing coordinates of the learning-local-segments;~~
- similar window extracting means for selecting a local-segment from the plurality of local-segments, for extracting a learning-local-segment from the learning image database by the shape-characteristic which is most similar to the selected local-segment, and for relating the extracted learning-local-segment to the selected local-segment by the shape-characteristic;
- object position estimating means for estimating a position of ~~an~~ the object ~~to be identified~~ in the input image from coordinates of the selected local-segment and coordinates of the related learning-local-segment by the shape-characteristic;
- counting means for providing the estimated position with a score by the shape-characteristics if the estimated position is not previously estimated, counting a ~~for adding a predetermined value to the score of the estimated position in the input image by the shape-characteristic if the estimated position is previously estimated, and for counting the score;~~ and
- object determining means for judging that the object ~~to be identified~~ is present at the estimated position when the counted score is greater than a predetermined number.

10. (Previously Presented) The image recognizing apparatus according to claim 8, wherein said learning means includes:

similar window integrating means for making the subsets of learning-local-segments which are similar to each other and for releasing image data of the representative learning-local-segment of each subset and the coordinates of all of the learning-local-segments in each subset; and

a same-type window database for storing the image data of the representative learning-local-segment of each subset and the coordinates of all of the learning-local-segments in each subset.

11. (Currently Amended) A computer-readable storage medium holding a program for making a computer carry out an image recognizing method of recognizing an object in an input image, said image recognizing method comprising the steps of:

- (a) dividing an input image into a plurality of local-segments;
- (a) (b) registering-providing a learning image database for storing a learning image including an image of the object, the learning image database further storing coordinates of each of the learning-local segments in the learning image into a learning image database;
- (b) dividing the input image into a plurality of local-segments;
- (c) selecting a local-segment from the plurality of local-segments;
- (d) extracting-a learning-local-segment, from the learning image stored in the learning image database, a learning-local-segment which is most similar to the selected local-segment of the input image;
- (e) as to relate the selected local-segment to relating the extracted learning-local-segment to the selected local-segment;

(f)(e) estimating a position of ~~an—the~~ object ~~to-be identified~~ in the input image from coordinates of the selected local-segment and coordinates of the related learning-local-segment;

(g)—(f) providing the estimated position with a score if the estimated position is not previously estimated, for updating—adding a predetermined value to the a-score of the estimated position in the input image if the estimated position is previously estimated, and counting the score;±

(h)—(g) repeating steps (c), (d), (e), and (f) and (g) for each local-segment of the plurality of local-segments; and

(i)—(h) judging that the object ~~to-be identified~~ is present at the estimated position when the updated counted score is greater than a predetermined number for the estimated position.

12-19. (Cancelled).